APPENDIX A

Alternatives Development

A.1 INTRODUCTION

Appendix A summarizes the process used to initially identify and screen project alternatives for the Draft EIS. Public Involvement was used to develop and refine alternatives. The public involvement process is further described in Appendix B. Terminology used and not defined in this appendix is listed in the Glossary.

Western began by considering short-term and long-term project alternatives. Short-term projects were defined as those completed within a 5-year period, and long-term projects were those requiring more than 5 years to complete. As specified in the NOI (published in the *Federal Register* [FR] August 2000), a near-term solution (short-term project) would be required to meet the project purpose.

A.2 ALTERNATIVES DEVELOPMENT

Although Western has sufficient capacity to serve its current customers, its transmission lines are part of a complex transmission system with other transmission line systems that extend beyond the Sacramento area. Demand for electricity through the transmission system can affect Western's ability to maintain the reliability and security of its transmission lines and maintain its necessary voltage profile. In response to these issues, several planning studies were conducted. The results of these studies are described below.

A.2.1 Power System Studies

Power system studies conducted by the Sacramento Area Transmission Planning Group (SATPG) and the River City Transmission Group (RCTG) concluded that transmission additions in the Sacramento area are necessary to alleviate voltage sag and ensure power system reliability. Results of the first phase of the SATPG study indicated that construction of a new 230,000-volt (230 kilovolt [kV]) circuit could provide short-term (3 to 5 years) system support to the region (SATPG 2000). The study concluded that long-term solutions (greater than 5 years) for area transmission security must also be developed. These solutions must include additional local generation or 500-kV transmission line options. Conclusions from the RCTG draft report also supported the need for additional transmission infrastructure to meet load growth and to provide for future generation (RCTG 2002-Draft). Western reviewed the recommendations and focused on the short-term solutions in the SVS alternatives development process.

A.2.2 Notice of Intent

Western published the NOI in the FR on August 8, 2000 (65 FR 48496). The NOI described Western's mission as an agency, the electrical power concerns in the Sacramento area, and issues to be considered in the development of the EIS. The NOI identified five broad alternative categories for consideration. These categories were compiled from Western's preliminary studies and the SATPG studies. The categories include:

- ***Upgrade existing transmission systems and facilities.*** Upgrading the existing transmission systems and facilities would involve modifications, such as reconductoring or replacing existing transmission lines with those that can carry more electricity. It could also include renovating and/or building new substations. These modifications could allow more power to be delivered to the load center or rerouting power more efficiently.
- ***New power generation.*** New powerplants, located close to the load centers or service areas, would reduce the amount of power flowing on the transmission system and boost the amount of power in the Sacramento service area.
- ***New transmission systems.*** New transmission lines would increase the transfer capability of the existing transmission system by reducing the load on the existing system, increasing the system's ability to distribute newly generated power. This would result in increasing the voltage level at the load center.
- ***Demand-side management.*** DSM would involve reducing the load in a critical area. This category would include energy conservation measures and prearranged means to reduce specific customer load during times of high demand. Air-conditioning cycling programs are an example of a prearranged DSM tool. This category would also include involuntary, automatic load shedding.
- ***Distributed generation.*** Distributed generation would consist of using solar, micro-turbines, fuel cells, or other generating devices at individual factories, farms, or homes. It is a relatively new concept of meeting individual customer's load by installing small sources of electrical power at designated sites. These sources (generators) would be sized to match a specific load such as a residence, industry, or community. Examples of these types of small generators are solar panels located at the load (panels on a residential roof), fuel cells using natural gas, small gas

turbines (micro- turbines), and traditional internal combustion engine/generator sets. These options are possible solutions because generation located at load sites would reduce the need to import power over the transmission system. Loads served by distributed generation would still be connected to the transmission system for regulation and backup power, should the small generator fail.

Following the NOI, public and agency scoping occurred from August 8, 2000 through October 2, 2000. Comments were also received at four public scoping meetings held in September 2000. Comments identified during the scoping period were organized into 12 issue categories and used to develop and refine alternatives for the Draft EIS. Scoping comments are summarized in Appendix B, Public Involvement.

A.2.3 Alternatives Development Phases

Following the scoping period, Western initiated a four-phased approach to identify a study region and project area, analyze alternative categories, select and screen alternatives for analysis, and identify a Proposed Action.

A.2.3.1 Phase One—Identification of Region of Influence

The phase began by identifying a study region of influence (ROI). The ROI focused on the electrical issues of the Sacramento area resulting from the preliminary planning and electrical systems studies and scoping. Proposed locations of new private generation facilities were considered in defining the ROI. The initial ROI was identified as 100-mile radius around the Sacramento area. The ROI was revised to a north-south elliptical circle overlaying the existing electrical transmission grid system. Appendix B, Public Involvement, presents a map of the ROI on Figure B-1.

A.2.3.2 Phase Two—Evaluation of Alternative Categories

The second phase examined the alternative categories presented in the NOI. Each category was required to meet the following four screening criteria. These criteria included:

- Provide adequate voltage support
- Provide reliable service
- Provide reliable transmission
- Technically feasible and can be implemented in the short-term time frame

From these criteria, Western eliminated three alternative categories from further consideration because they were not consistent with the Western's Purpose and Need. DSM, distributed generation, and new generation plants were eliminated due to their technical feasibility, time constraints, and/or limited effectiveness for providing reliable service or voltage support.

DSM has and continues to be implemented by Sacramento area utilities for its retail and nonretail customers. These programs have been successfully used in the Sacramento area and credited with helping the area avoid rotating blackouts during the summer of 2001. However, Western does not consider DSM to be a solution for resolving energy problems in the short-term. No new generation or transmission capacity would be created under this alternative to meet projected demands. Even with the current economic recession in the Sacramento area, California Independant System Operator Corporation (ISO)(www.caiso.com) forecast that the Sacramento area might experience its next shortfall in electricity by the summer of 2003, requiring more generation and transmission capability.

Distributed generation also helps to offset the customer's load by installing small sources of electrical power at or near the load. Distributed generation would require a substantial initial capital investment that may be beyond the individual homeowner's ability to purchase without government subsidy. This alternative category is also more expensive than current utility rates, creating consumer resistance for widespread implementation. Zoning, housing development restrictive covenants, and other restrictions may also limit the potential of implementing this category in urban areas. In addition, distributed generation would apply more to the retail level and not to Western's customers, the wholesale market.

Construction of new power generation facilities was the third alternative category, which did not meet all four screening criteria. Western's mission is to serve as a Federal power marketing administration charged with the responsibility to market electricity generated by powerplants operated by the Bureau, USACE, and the IBWC. Western's mission may be expanded at some point to include new generation. However, time required to design, permit, and construct such facilities could not be completed in the near term.

Results of the second phase of the alternatives development process concluded that the alternative categories for upgrading existing and construction of new transmission systems met each of the screening criteria. The categories of DSM, distributed generation, and new power generation were eliminated from further study.

A.2.3.3 Phase Three—Alternatives Screening

The third phase of the alternatives development process focused on potentially upgrading existing transmission line systems and facilities and constructing new transmission lines. Western reviewed the overall electrical grid in the Sacramento area together with known potential sites for locating new generation plants. Based on the potential sites identified, Western identified seven preliminary transmission system/line alternatives that could improve the voltage support, as well as the reliability and security of the power system. These alternatives included upgrading (reconductoring) existing transmission lines, constructing new 230-kV transmission lines, constructing new 500-kV transmission lines that would initially be energized at 230-kV (230/500-kV), and constructing new 500-kV transmission lines operated at 500 kV. Seven preliminary transmission system/line alternatives are displayed in Table A-1.

Western applied environmental and engineering screening criteria to the preliminary alternatives. Five engineering constraint criteria and 33 environmental exclusion and avoidance criteria were applied to each alternative. Below are a brief description of each alternative and a summary of environmental and engineering issues and constraints.

Alternative A—Reconductoring Existing Single- and Double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation

Reconductoring the existing 230-kV transmission line from O'Banion Substation to Tracy Substation would replace existing conductors with new conductors using most of the existing structures. Some existing structures would be replaced. No new ROW would be required. The reconductoring alternative route crosses irrigated agricultural areas along the existing ROW particularly from O'Banion Substation to Elverta Substation. The existing transmission line route also crosses recreation areas and passes near several areas of residences and structures.

Assessment of the reconductoring alternative indicates this route would potentially cross bald eagle winter ranges, surface waters (streams and rivers), wetlands, and other conservation areas, but the impact to these areas would be minimal. Work crews would be in the affected areas for a limited time, and new conductors could be spanned over most surface waters. A review of existing cultural resource surveys indicate that there have been isolated finds along the route.

Alternative B—New Double-circuit, 230/500-kV Transmission Line from O'Banion Substation to Elverta Substation

A new double-circuit, 230/500-kV transmission line from O'Banion Substation to Elverta Substation would be constructed adjacent to the existing O'Banion–Elverta double-circuit 230-kV transmission line and would traverse land similar to the northern portion of the reconductoring alternative to Elverta Substation. New ROW and access roads would be required. Much of this route would pass through agricultural areas and grasslands. Although potential impacts would be greater than reconductoring due to new transmission line construction, the alternative was not rejected by the environmental and engineering screening criteria.

Alternative C—New Double-circuit 230/500-kV Transmission Line from Elk Grove Substation to Tracy Substation

A new double-circuit, 230/500-kV transmission line from Elk Grove Substation to Tracy Substation would parallel the existing Elk Grove–Tracy double-circuit, 230-kV transmission line. This alternative would require new ROW for transmission line construction, and access roads. Potential impacts would be greater than reconductoring because of greater ground disturbance

Table A-1. Preliminary Transmission Line Alternatives

Alternative	Description of Alternative
A	Reconductoring existing double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation
B	New double-circuit, 230/500-kV transmission line from O'Banion Substation to Elverta Substation
C	New double-circuit, 230/500-kV transmission line from Elk Grove Substation to Tracy Substation
D	Upgrading to double-circuit, 500-kV the Cottonwood–Roseville double-circuit, 230-kV transmission line between Table Mountain Substation and Elverta Substation
E	New double-circuit, 230/500-kV transmission line from Elverta Substation to Tracy Substation
F	New double-circuit, 500-kV transmission line from Maxwell Substation to Elverta Substation
G	Two new single-circuit, 500-kV transmission lines from the Yolo area to Elverta Substation

Source: Original 2001

resulting from new construction. This alternative was not rejected from the environmental and engineering screening criteria.

Alternative D—Upgrading the Cottonwood to Roseville Line between Table Mountain and Elverta to Double-circuit 500-kV Transmission Line

A Cottonwood–Roseville double-circuit, 500-kV upgrade would result in a number of potential impacts. The existing transmission line passes through residential areas in Oroville and south of the Oroville area. Major wetland areas occur along the route. There are historical issues and associated sites including levees and extensive mine tailings (dredge materials) in the area. There are also areas of steep slopes (greater than 40 percent) near Oroville where access road construction would potentially result in soil erosion.

Alternative E—New Double-circuit 230/500-kV Transmission Line from Elverta Substation to Tracy Substation

Construction of a new Elverta–Tracy double-circuit, 230/500-kV transmission line would route the new transmission line through a densely populated portion of the metropolitan Sacramento area, south of the Elverta Substation. The alternative would require new ROW for most of the route, transmission line construction, and access roads. Numerous residential and recreation land use and visual impacts would result along the route in the metropolitan area.

Alternative F—New Double-circuit 500-kV Transmission Line from Maxwell Substation to Elverta Substation

Construction of a new Maxwell–Elverta double-circuit, 500-kV transmission line would parallel in certain locations existing transmission lines. However, a major portion of the route would not parallel existing utility ROWs. New ROW, transmission line construction, and access roads would be required. Impacts would potentially occur in several areas of previously undisturbed landscapes. Visual impacts could also result particularly where the route would not parallel other existing transmission line routes.

Alternative G—Two New Single-circuit 500-kV Transmission Lines from the Yolo Area to Elverta Substation

Construction of two single-circuit, 500-kV transmission lines from the Yolo area to Elverta Substation would require new ROW and access roads along certain portions of the route not paralleling existing transmission lines. Types of impacts would be similar to those described for Alternative F.

Phase Three Conclusions

Results of the screening criteria dropped several preliminary alternatives from further study. Construction of new 500-kV transmission lines would require lengthy planning and engineering studies to ensure that all suppliers of energy into the intertie system are protected. Construction of new 500-kV transmission lines, while crucial to providing a long-term solution to the Sacramento area, as well as California energy problems, could not be completed within the near term. Based on time constraints, 500-kV transmission line alternatives were not carried forward. Similarly, construction of new 230/500-kV transmission lines was dropped from further consideration and was only considered for 230-kV alternatives. The alternatives carried forward focused on improvements to and construction of double-circuit, 230-kV transmission lines which paralleled existing transmission line ROWs.

Based on the findings of the analysis during the third phase, Western dropped preliminary alternatives D, E, F, and G. Therefore, the alternatives carried forward were reconductoring the existing double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation; a new double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation; and a new double-circuit, 230-kV transmission line from Elk Grove Substation to Tracy Substation.

A.2.3.4 Phase Four—Development of Proposed Action and Alternatives

During the fourth phase of the alternatives development process, Western studied the alternatives carried forward and developed a Proposed Action. The Proposed Action would include the combination of reconductoring the existing Elverta–Tracy 230-kV transmission lines and constructing a new double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation. Four alternatives—three action and the No Action—were carried forward for detailed environmental analysis. The Draft EIS alternatives include:

- The Proposed Action
- Alternative 1—Reconductor the existing double-circuit, 230-kV transmission line from O'Banion Substation to Tracy Substation
- Alternative 2—New double-circuit, 230-kV transmission line from O'Banion Substation to Elverta Substation
- Alternative 3—New double-circuit, 230-kV transmission line from Elk Grove Substation to Tracy Substation
- No Action